

Claims

1. A stairlift including a stairlift rail; a carriage mounted on said rail for movement there along; a chair pivotally mounted on said carriage; and braking means operable to brake said carriage from further movement on said rail, said stairlift being characterised in that angle determining means are provided to determine out-of-level positions of said chair, said angle determining means being capable of causing actuation of said braking means.
2. A stairlift as claimed in claim 1 wherein said braking means includes speed sensing means operable to sense, electronically, the speed of said carriage along said rail.
3. A stairlift as claimed in claim 2 wherein said speed sensing means includes a roller in rolling contact with said rail; and means to determine the speed of rotation of said roller.
4. A stairlift as claimed in claim 4 wherein said speed sensing means includes at least one magnet which rotates with said roller; and a pick up operable to generate an electro-magnetic signal from the passage of said magnet thereby, said pick-up providing a speed output signal representative of the speed of rotation of said roller.
5. A stairlift as claimed in claim 3 or claim 4 wherein, in the event of said speed output signal indicating a speed in excess of a pre-determined maximum carriage speed, said braking means triggers a solenoid to engage said braking means with said roller and, thereby, cause a braking member to engage with said rail.

6. A stairlift as claimed in any one of the preceding claims wherein said braking means is provided, in part, by a microprocessor, said microprocessor being constructed and arranged to receive said speed output signal and, in response to said speed output signal indicating a speed in excess of said pre-determined carriage speed, to generate a command to trigger said solenoid.
7. A stairlift as claimed in claim 6 wherein said microprocessor is further constructed and arranged to receive a signal from said angle determining means and, in response to said angle determining means indicating a chair angle in excess of a predetermined angle from the horizontal, to generate a command to trigger said solenoid.
8. Control means for a stairlift, said stairlift including:
- a stairlift rail having rail sections which, when installed, are arranged at different angles to a horizontal plane;
- a carriage mounted on said rail for movement there along;
- a chair pivotally mounted on said carriage;
- braking means operable to brake said carriage with respect to said rail;
- speed sensing means operable to sense the speed of said carriage along said rail; and
- angle sensing means operable to sense positions of said chair at which the angle thereof with respect to said horizontal plane is at or in excess of a limit;

said control means including a microprocessor operable to receive signals from said speed sensing means and from said angle sensing means, and to generate a command to operate said braking means in response to said speed sensing means sensing a carriage speed in excess of a predetermined maximum, or said angle sensing means
5 sensing a chair angle in excess of a predetermined maximum.

9. A method of controlling a stairlift, said stairlift including:

a stairlift rail having rail sections which, when installed, are arranged at different angles to a horizontal plane;

10 a carriage mounted on said rail for movement there along;

a chair pivotally mounted on said carriage;

braking means operable to brake said carriage with respect to said rail;

speed sensing means operable to sense the speed of said carriage along said rail; and

15 angle sensing means operable to sense positions of said chair at which the angle thereof with respect to said horizontal plane is at or in excess of a limit;

said method including monitoring the speed of said carriage along said rail and monitoring the angle of said chair with respect to the
20 horizontal and, in the event either said speed or said angle depart from predetermined limits, causing said braking means to be operated.

10. A method of testing the operation of an over-speed governor included within a stairlift carriage, said governor acting in combination with electronic speed sensing means and a governor actuation circuit, said method including simulating an electrical signal indicative of carriage speed, applying said signal to said governor actuation circuit and observing a response of said governor.
11. A stairlift carriage for movement along a stairlift rail, said carriage including;
- a drive motor operable to drive said carriage along said rail;
- an over-speed governor operable to brake said carriage with respect to said rail;
- limit engagement means operable independently of said over-speed governor and positioned to engage limit stops at each end of said rail,
- said carriage being characterized in that said over-speed governor and said limit engagement means are constructed and arranged to actuate a common isolation switch thereby cutting power to said drive motor.
12. A carriage as claimed in claim 11 wherein said limit engagement means is further constructed and arranged to convey a charging current from said rail to a battery located within said carriage.
13. An electronics based over-speed governor for braking a stairlift carriage with respect to a stairlift rail, said governor including:

electronic speed sensing means operable to sense the speed of said carriage along said rail;

a braking member included within said carriage and displaceable into contact with said rail; and

5 a solenoid actuated in response to an over-speed state being sensed by said speed sensing means to cause displacement of said braking member, said governor being characterized in that, when said carriage is stationary, said solenoid may be energised and de-energised without causing displacement of said braking member.

10 14. A stairlift carriage including the over-speed governor as claimed in claim 13, wherein said solenoid is energised and de-energised each time power is respectively supplied to or removed from, said carriage.